

# Appendix A

## Excerpts From Land Development Code of the Confederated Tribes of the Umatilla Indian Reservation

### **Sub-Chapter G. I-D: Industrial Development Zone**

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#### ***Section 3.165 Description and Purpose***

The I-D, Industrial Development Zone is intended to provide areas for industrial development compatible with the economic resource base of the Umatilla Indian Reservation and the economic needs and wants of the people of the reservation. This zone designation is appropriate for areas in close proximity to major transportation facilities and necessary utilities, while protecting the existing rural character of the area as well as preserving or enhancing the air, water and land resources of the area.

#### ***Section 3.185 Uses Permitted***

In an I-D, Industrial Development Zone the following uses and accessory uses are permitted upon issuance of a Development Permit.

- Addition to an existing conforming structure of not more than 50% in area;
- Blacksmith or machine shop;
- Wholesale greenhouse or nursery;
- Grain elevator;
- Hauling, freighting and trucking yard or terminal;
- Ice or cold storage plant;
- Manufacturing, compounding, assembling or treatment of products made from the following prepared materials: Canvas, cloth, cork, feathers, felt, fur, glass, hair, horn, leather, paper, precious or semi-precious metals or stone, textiles, wood and yarns, but not including a rendering plant.
- Warehouse or mini-warehouses;
- Foundry, less than 2,500 square feet of area;
- Tire recapping;
- Custom meat cutting and cold storage locker;
- Any other held similar to the above uses, as approved by the Natural Resources Commission;
- Farming;
- Contractor's or building materials business and other construction-related business including plumbing, electrical, roof, siding, etc.,

provided such use is wholly enclosed within a building or no outside storage is permitted unless enclosed by sight-obscuring fence;

- Freight Depot;
- Wholesale distribution outlet including warehousing but excluding open outside storage;
- Electrical substations;
- Laboratory for experiment, research or testing;
- Welding, sheet metal or machine shop provided such is wholly enclosed within a building or all outside storage is enclosed by sight-obscuring fencing.

### ***Section 3.190 Conditional Uses Permitted***

In an I-D Industrial Development zone the following uses and their accessory uses are permitted, subject to the requirements of Section 6.010 through Section 6.035 inclusive and upon issuance of a Development Permit:

- Food products manufacturing, excluding meat, fish, salt, sauerkraut, sugar, vinegar, and yeast products;
- Flour Mill;
- Animal hospital or veterinary clinic;
- Concrete block or pipe manufacturing;
- Concrete manufacturing plant;
- Major manufacturing, repairing, compounding, fabricating, assembling, processing or storage industries having any one of the following characteristics:
  - Peak employment of more than 100 persons;
  - Utilizing more than 15 acres of land;
  - Requiring water at a volume greater than 50 gallons per minute peak;
  - Foundry, in excess of 2,500 square feet of area;
  - Alternative energy activities;
- Mobile home or dwelling unit accessory to a permitted or conditional use, for use as accommodations for a caretaker or night watchman;
- Any other use held similar to the above uses, as approved by the Natural Resources Commission;
- For those buildings over 25 feet in height.

## **Appendix B**

### **Coyote Business Park Riparian Management Zone**

Under Alternatives B, C, D, or E, a Riparian Management Zone (RMZ) would be established along Patawa Creek in the affected development area. This proposed RMZ would be the first established in an agricultural area. The proposed structure of the zone is based on the RMZ as described in the current Draft Agricultural Management Plan of the CTUIR.

#### **Extent of Riparian Management Zone**

The RMZ would apply to an area defined as 75 feet times the stream order. Patawa Creek in the area of the proposed Coyote Business Park includes reaches that are Stream Order 2 and 3. Patawa Creek is an Order 2 Stream for approximately 1,670 feet upstream of where an unnamed tributary enters it (from a culvert crossing under I-84) and west of South Market Road. Patawa Creek is an Order 3 Stream downstream of this tributary (for a reach of approximately 4,760 feet east of Billy Road).

Thus, the RMZ would extend 225 foot along Patawa Creek downstream of the unnamed tributary and 150 foot zone along Patawa Creek upstream of the unnamed tributary. This distance would be applied on both sides of the stream channel, where possible, and measured from the edge of the active floodplain.

The proposed RMZ would be applied in that area of Patawa Creek reach that would otherwise be affected by the proposed Business Park. Therefore, the size of the RMZ would vary between the actions proposed for the Business Park.

#### ***Alternative A***

Under the Existing Conditions, the CTUIR Tribal Farm Enterprise would continue the current practice of maintaining a 30' buffer in non-native annual grass along a reach of approximately 2,900 feet. The portion of the site that is leased to a private individual would continue to be maintained in the condition of farming to the active floodplain along a reach of approximately 3,630 feet.

Total estimated acreage in buffer strip: 1 acre

#### ***Alternative B***

Under Alternative B, a RMZ would be created for 75' along a 400 foot reach of Patawa Creek. This would be on the south side of Patawa Creek only (due to presence of access road on north side, which is in non-CTUIR ownership, it would not possible to create

the RMZ on north side; so the RMZ is actually 75 feet on south side of creek only.)

The CTUIR Tribal Farm Enterprise would continue the current practice of maintaining a 30' buffer in non-native annual grass along the remainder of the Patawa Creek reach in the area that the CTUIR farms. The portion of the site that is leased to a private individual would continue to be maintained in the condition of farming to the active floodplain.

Total estimated acreage in RMZ: .70 acres

Total estimated acreage in buffer strip: <1 acre

### ***Alternatives C, D, and E***

Under any of these Alternatives, an RMZ would be created for 150' along a 1,670 foot reach of Patawa Creek (approximately 6 acres). A 225' wide RMZ would be created along a 4,760 foot reach of Patawa Creek (approximately 23 acres).

ODOT would propose to abandon the existing access road and support mechanical "de-compaction" of the road once an alternate access road through Coyote Business Park has been established. Recovery of the road would include removal of any asphalt surface, recontouring of the ground surface to create a smooth transition from the active floodplain to the terrace, and rip or subsoil the roadbed in order to reduce compaction. This area would be incorporated in the management of the RMZ although it would remain under ODOT ownership.

A new bridge would be constructed through the RMZ to provide access to the gravel shed and the CTUIR transfer station. This bridge would be designed to avoid introducing roadway runoff into Patawa Creek (see Chapter 2 for more detail on bridge construction).

Under these Alternatives, the portion of land that had been in the Tribal Farm Enterprise buffer strip would be incorporated into the RMZ.

Total estimated acreage in RMZ: 29 acres

## **Objectives for Coyote Business Riparian Management Zone**

- Provide a buffer to prevent sediment anticipated from construction and operation activities at Coyote Business Park from reaching Patawa Creek
- Prevent stormwater runoff anticipated from Coyote Business Park from reaching Patawa Creek.
- Provide flood control protection for Coyote Business Park by allowing room for any future flood events (50+ year flood events) that may result in the creek jumping out of the currently entrenched creek channel and not impacting business operations.
- Allow adequate room for eventual active or passive channel recovery (the buffer has to allow adequate room to re-establish a meander path)
- Protect remnant native plant populations and allow for passive re-establishment of native wildlife species to the extent consistent with ongoing business park operations

### ***Entry***

For industrial/urban development activity, the RMZ would not be entered for any development purposes (structures or construction would not be allowed in RMZs). Roads should be developed so that minimal area within the RMZ is disturbed and road crossings are perpendicular to channel orientation. The RMZs can be entered for the purpose of meeting riparian/channel improvement and water quality improvement objectives. The reasons for entering RMZs might include noxious weed treatment, planting of riparian or upland plants in appropriate places, channel restoration, and habitat enhancement (fish & wildlife). For example the RMZ could be entered by a tractor in order to prepare the ground and plant grass outside of the active floodplain.

### ***Recreational Use***

Recreational use is not a defined purpose of the Riparian Management Zone, and recreational access by employees at Coyote Business Park is discouraged.

### ***Management***

Coyote Business Park RMZ would be planted in perennial native grass (Great Basin Wild Rye for example) and sprayed for treatment of noxious weeds. Planting of native woody species within the active floodplain (willow, cottonwood, alder, dogwood, rose, and other native riparian species) would take place in year two after a second spraying of noxious weeds. Irrigation is not anticipated for these species.

The outer fifty feet of the RMZ may be mowed throughout the summer to provide fire protection.

### ***Establishment and Funding of RMZ***

The RMZ would be established concurrently with infrastructure construction or sooner if funding permits. The RMZ would be managed by a contractor (including, potentially, the CTUIR Fisheries or Wildlife programs) and paid for out of revenues identified by the Board of Trustees. The Conservation Reserve Enhancement Program is one potential source of funding.

### ***Noxious weed control plan***

A noxious weed control plan would be developed as part of the management plan for the RMZ.

# Appendix C

## Wellhead Protection

Groundwater is a critical natural resource that provides municipal, domestic, industrial, and agricultural water supplies for the people living on the Umatilla Indian Reservation. In order to protect the public drinking water-supply system from potential sources of contamination, the CTUIR is in the process of developing a drinking water assessment and protection (DWAP) plan<sup>1</sup> for the CTUIR municipal water system (MWS).

Protection is provided by determining the area that contributes groundwater to the Tribal MWS wells, identifying potential sources of contamination within the area contributing groundwater, and developing methods to manage the area and minimize the threat of contaminants entering the drinking water supply. A proactive approach to DWAP planning includes education and public awareness which will help minimize and potentially prevent contamination of the aquifers serving the community of Mission.

For the Tribes' groundwater-based MWS the DWAP plan establishes protection areas overlying the aquifer(s) that yield water to municipal wells and extends a prescribed distance from the well. The extent of the protection areas was determined by a calculated fixed radius method (DEQ 1996) using aquifer properties of porosity and permeability, and a pumping rate for MW#5 (125% of the average three-month maximum pumping rate for the year).

For most delineation techniques a minimum TOT value of 10 years is applied. This TOT is based on State of Oregon estimate of the time required to remediate and/or develop a new water source should contamination of the aquifer occur within the area designated for protection. In cases where the understanding of groundwater conditions is limited or significant threats to groundwater quality occur, longer TOT threshold values should be used. Due to the limited understanding of groundwater conditions in the area (specifically hydraulic gradient), a 15-year TOT was selected to provide adequate protection of groundwater quality.

Because of the uncertainty of groundwater conditions beneath the proposed Coyote Business Park and the proximity of the park to MW#5, wellhead protection measures should be implemented to protect groundwater quality and

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To meet the requirements of the federal Safe Drinking Water Act (SDWA), Public Law 104-182, pursuant to a Source Water Assessment and Protection Grant Agreement X-98088201-0 from the U.S. Environmental Protection Agency (EPA), and under Section 4.02 C.4 of the Groundwater Pollution Control of the Tribal Water Resources Protection Code, the CTUIR is developing a DWAP plan. The DWAP plan was prepared under the guidelines set forth by the Oregon Department of Environmental Quality (DEQ) in Oregon Wellhead Protection Guidance Manual (May 1996).

supply. Best management practices (BMP) for businesses are provided in Table C-1 (DEQ 1996). These BMPs have not been formally adopted by the CTUIR.

<b>Table C-1</b> <b>General Best Management Practices (BMPs)</b> <b>for Commercial / Industrial Facilities (DEQ 1996)</b>	
Source	Description
<b>Design BMPs</b>	
Floor Drains	Eliminate floor drain discharges to the ground, septic systems (except in sanitary facilities), storm sewers, or to any surface water body from any location in the facility.
	If no floor drains are installed, all discharges to the floor should be collected, contained, and disposed of by an appropriate waste hauler in accordance with federal and state requirements.
	Floor drains in sanitary facilities must either discharge to a septic system, a municipal sanitary sewer, or a holding tank, which is periodically pumped out.
	Floor drains in work areas can either be connected to a holding tank with a gravity discharge pipe, or to a collection sump, which discharges to a holding tank.
Dry Wells	Dry wells should be eliminated in ALL cases unless they receive ONLY CLEAN WATER DISCHARGES, which meets all established Maximum Contaminant Levels (MCLs) promulgated under the <i>Safe Drinking Water Act</i> and other state and local standards for drinking water, and is in compliance with any other state and local requirements.



**Table C-1**  
**General Best Management Practices (BMPs)**  
**for Commercial / Industrial Facilities (DEQ 1996)**

Source	Description
Floors	Floor surfaces in work areas and chemical storage areas should be sealed with an impermeable material resistant to acids, caustics, solvents, oils, or any other substance which may be used or generated at the facility. Sealed floors are easier to clean without the use of solvents.
	Work area floors should be pitched to appropriate floor drains. If floor drains are not used, or if they are located close to entrance ways, then berms should be constructed along the full width of entrances to prevent storm water runoff from entering the building.
	Berms should also be used to isolate floor drains from spill-prone areas.
Storage Facilities	Loading and unloading of materials and waste should be done within an enclosed or roofed area with secondary containment and isolated from floor drains to prevent potential spills from contaminating storm water or discharging to the ground. Alternatives to roofing include supplemental holding facilities for spills, grading of the area, use of impact-resistant materials.
	Underground storage tanks should not be used, unless explicitly required by fire codes or other federal, state or local regulations.

**Table C-1**  
**General Best Management Practices (BMPs)**  
**for Commercial / Industrial Facilities (DEQ 1996)**

Source	Description
	Where underground tanks are required, they should have double-walled construction or secondary containment such as a concrete vault lined or sealed with an impermeable material and filled with sand. Both types of tanks should have appropriate secondary containment monitoring, high level and leak sending audio/visual alarms, level indicators, and overfill protection. If a dip stick is used for level measurements, there should be a protective plate or basket where the stick may strike the tank bottom.
	Above-ground tanks should have 110 percent secondary containment or double-walled construction, alarms, and overfill protection, and should be installed in an enclosed area isolated from floor drains, storm water sewers, or other conduits which may cause a release into the environment.
	Fill-pipe inlets should be above the elevation of the top of the storage tank.
	Tanks and associated appurtenances should be tested periodically for structural integrity.
	Storage areas for new and waste materials should be permanently roofed, completely confined within secondary confinement berms, isolated from floor drains, have sealed surfaces, and should not be accessible to unauthorized personnel.
	Drum and container storage areas should be consolidated into one location for better control of material and waste inventory.

**Table C-1**  
**General Best Management Practices (BMPs)**  
**for Commercial / Industrial Facilities (DEQ 1996)**

Source	Description
Cooling Water	Closed-top cooling systems should be considered to eliminate cooling water discharges.
	Any cooling water from solvent recovery systems should be free of combination from solvent, metals, or other pollutants, and should not discharge to the ground. Cooling water may be discharged to a storm sewer, sanitary sewer, or stream, provided all federal, state, and local requirements are met.
Water Conservation	Flow restrictions and low-flow faucets for sinks and spray nozzles should be installed to minimize hydraulic loading to subsurface disposal systems.
Foundation Drainage & Dewatering	If water from foundation drainage and dewatering is not contaminated, it may be discharged to a storm sewer or stream in accordance with any applicable federal, state, or local requirements.
	Contaminated water from foundation drainage and dewatering indicates a likely groundwater combination problem, which should be investigated and remediated as necessary.
Storm Water Management	Storm water contact with materials and wastes must be avoided to the greatest extent possible. Storage of materials and wastes should be isolated in roofed or enclosed areas to prevent contact with precipitation.
	Uncovered storage areas should have a separate storm water collection system which discharges to a tank.

**Table C-1**  
**General Best Management Practices (BMPs)**  
**for Commercial / Industrial Facilities (DEQ 1996)**

Source	Description
	Storm water from building roofs may discharge to the ground. However, if solvent distillation equipment or vapor degreasing is used, with a vent that exhausts to the roof, then roof leaders may become cross-contaminated with solvent. These potential sources of cross contamination must be investigated and eliminated.
Cross-Connections	Cross-connections such as sanitary discharges to storm sewers; storm water discharges to sanitary sewers, or floor drain discharges to storm sewer systems, should be identified and eliminated.
Work Areas	Consolidate waste-generating operations and physically segregate them from other operations. They should preferably be located within a confinement area with sealed floors and with no direct access to outside the facility. This reduces the total work area exposed to solvents, facilitates waste stream segregation and efficient material and waste handling, and minimizes cross combination with other operations and potential pathways for release into the environment.
	Waste collection stations should be provided throughout work areas for the accumulation of spent chemicals, soiled rags, etc. Each station should have labeled containers for each type of waste fluid. This provides safe interim storage of wastes, reduces frequent handling of small quantities of wastes to storage areas, and minimizes the overall risk of a release into the environment.

**Table C-1**  
**General Best Management Practices (BMPs)**  
**for Commercial / Industrial Facilities (DEQ 1996)**

Source	Description
	New solvent can be supplied by dedicated feed lines or dispensers to minimize handling of materials. These feed lines must default to a closed setting to prevent unmonitored release of material.
Connection of Municipal Sanitary Sewers	Existing and future facilities should connect their sanitary facilities to municipal sanitary sewer systems where they are available.
Holding Tanks	Facilities should discharge to holding tanks if they are located where municipal sanitary sewers are not available, subsurface disposal systems are not feasible, existing subsurface disposal systems are failing, or if they are high risk facilities located in wellhead protection areas.
<b>Operational BMPs</b>	
Material & Waste Inventory Control	Conduct monthly monitoring of inventory and waste generation.
	Order raw materials on an as-needed basis and in appropriate unit sizes to avoid waste and reduce inventory.
	Observe expiration dates on products in inventory.
	Eliminate obsolete or excess materials from inventory.
	Return unused or obsolete products to the vendor.
	Consider waste management costs when buying new materials and equipment.
	Ensure materials and waste containers are properly labeled. Not labeling or mislabeling is a common problem.

**Table C-1  
General Best Management Practices (BMPs)  
for Commercial / Industrial Facilities (DEQ 1996)**

Source	Description
	Mark purchase date and use older materials first.
	Maintain products Material Safety Data Sheets to monitor in inventory and the chemical ingredients of wastes. Make MSDS sheets available to employees.
	Observe maximum on-site storage times for wastes.
Preventative & Corrective Maintenance	A regularly scheduled internal inspection and maintenance program should be implemented to service equipment, to identify potential leaks and spills from storage and equipment failure, and to take corrective action as necessary to avoid a release to the environment. At a minimum, the schedule should address the following areas:
	Tanks, drums, containers, pumps, equipment, and plumbing;
	Work stations and waste disposal stations;
	Outside and inside storage areas, and storm water catch basins and detention ponds;
	Evidence of leaks or spills within the facility and on the site;
	Areas prone to heavy traffic from loading and off loading of materials and wastes;
	Properly secured containers when not in use;
	Proper handling of all containers;
	Drippage from exhaust vents;
	Proper operation of equipment, solvent recovery, and emission control systems.

**Table C-1**  
**General Best Management Practices (BMPs)**  
**for Commercial / Industrial Facilities (DEQ 1996)**

Source	Description
Spill Control	Use emergency spill kits and equipment. Locate them at storage areas, loading and unloading areas, dispensing areas, work areas.
	Clean spills promptly.
	Use recyclable rags or absorbent spill pads to clean up minor spills, and dispose of these materials properly.
	Clean large spills with a wet vacuum, squeegee and dust pan, absorbent pads, or brooms. Dispose of all clean up materials properly.
	Minimize the use of disposable granular or powder-absorbents.
	Spilled materials should be neutralized as prescribed in Material Safety Data Sheets (MSDS), collected, handled, and disposed of in accordance with federal, state, and local regulations.
	Use shake-proof and earthquake proof containers and storage facilities to reduce spill potential.
Materials & Waste Management	Use spigots, pumps, or funnels for controlled dispensation and transfer of materials to reduce spillage; use different spigots, etc., for different products to maintain segregation and minimize spillage.
	Store materials in a controlled, enclosed environment (minimal temperature and humidity variations) to prolong shelf life, minimize evaporative releases, and prevent moisture from accumulating.
	Keep containers closed to prevent evaporation, oxidation, and spillage.
	Place drip pans under containers and storage racks to collect spillage.

**Table C-1**  
**General Best Management Practices (BMPs)**  
**for Commercial / Industrial Facilities (DEQ 1996)**

Source	Description
	Segregate wastes that are generated, such as hazardous from non-hazardous, acids from bases, chlorinated from nonchlorinated solvents, and oils from solvents, to minimize disposal costs and facilitate recycling and reuse.
	Empty drums and containers may be reused, after being properly rinsed, for storing the same or compatible materials.
	Recycle cleaning rags and have them cleaned by an appropriate industrial launderer.
	Use dry cleanup methods and mopping rather than flooding with water.
	Floors may be roughly cleaned with absorbent prior to mopping; select absorbents which can be reused or recycled.
	Recycle cardboard and paper, and reuse or recycle containers and drums.
	Wastes accumulated in holding tanks and containers must be disposed of through an appropriately licensed waste transporter in accordance with federal, state, and local regulations.



**Table C-1**  
**General Best Management Practices (BMPs)**  
**for Commercial / Industrial Facilities (DEQ 1996)**

Source	Description
Management	<p>Management involvement in the waste reduction and pollution prevention initiatives is essential to its successful implementation in the work place. By setting the example and encouraging staff participation through incentives or awards, management can increase employee awareness about environmentally sound practices. A first step is to involve management in conducting a waste stream analysis to determine the potential for waste reduction and pollution prevention. This analysis should include the following steps:</p>
	Identify plant processes where chemicals are used and waste is generated;
	Evaluate existing waste management and reduction methods;
	Research alternative technologies;
	Evaluate feasibility of waste reduction options;
	Implement measures to reduce wastes; and
	Periodically evaluate your waste reduction program.
	Develop an energy and materials conservation plan to promote the use of efficient technologies, well-maintained inventories, and reduced water and energy consumption.

**Table C-1  
General Best Management Practices (BMPs)  
for Commercial / Industrial Facilities (DEQ 1996)**

Source	Description
	Sound environmental management should include the currency and completeness of site and facility plans, facility records and inventory management, discharge permits, manifests for disposal of wastes, contracts with haulers for wastes, and contracts with service agents to handle recycling of solvents or to regularly service equipment.
Employee Training	Training programs should be developed which include the following:
	Proper operation of process equipment;
	Loading and unloading of materials;
	Purchasing, labeling, storing, transferring, and disposal of materials;
	Leak detection, spill control, and emergency procedures; and
	Reuse/recycling/material substitution.
	Employees should be trained prior to working with equipment or handling of materials, and should be periodically refreshed when new regulations or procedures are developed.
	Employees should be made aware of MSDS sheets and should understand their information.
	Employee awareness of the environmental and economic benefits of waste reduction and pollution prevention, and the adverse consequences of ignoring them, can also facilitate employee participation.
Communication	Posting of signs, communication with staff, education and training, and posting of manuals for spill control, health and safety (OSHA), operation and

**Table C-1**  
**General Best Management Practices (BMPs)**  
**for Commercial / Industrial Facilities (DEQ 1996)**

Source	Description
	<p>maintenance of facility and equipment, and emergency response are essential, Storage areas for chemicals and equipment, employee bathrooms, manager's office, and waste handling stations are suggested areas for posting communication. A bulletin board solely for environmental concerns should be considered.</p>
Record Keeping	<p>Facility plans, plumbing plans, and subsurface disposal system plans and specifications must be updated to reflect current facility configuration. Copies of associated approvals and permits should be maintained on file.</p>
	<p>OHSA requirements, health and environmental emergency procedures, materials management plans, inventory records, servicing/repair/inspections logs, medical waste tracking and hazardous waste disposal records must be maintained up to date and made available for inspection by regulatory officials.</p>
<p>Source: Inglese, Jr., O. 1992. Best Management Practices for the Protection of Groundwater: A Local Official's Guide to Managing Class V UIC Wells. Connecticut Department of Environmental Protection, Hartford, CT, 138 pp.</p>	

# Appendix D

## Plants Species Inventory of Project Site

Table D-1  
Plant Species Identified at Proposed Project Site

Scientific Name	Common Name
<b>Site A-Main channel</b>	
Nepeta cateria	catnip, mint
Solanum dulcamera	bitter nightshade
Rubus discolor	blackberry
Salix spp	willow
Typha latifolia	cattail
Epilobium ciliatum	common willow herb
Cirsium arvense	Canada thistle
Phalaris arundinacea	reed canary grass
Thinopyron intermedium	intermediate wheatgrass
Dipsacus fullonum	teasel
Rosa woodsii	Wood's rose
Hypericum perforatum	Klamathweed
Mimulus guttatus	monkey flower
Polygonum hydropiperoides	swamp smartweed
Veronica americana	American speedwell
<b>Site B- SW facing slope</b>	
Bromus tectorum	cheat grass
Avena fatua	wild oat
Sisymbrium altissimum	tumble mustard
Cirsium arvense	Canada thistle
Elymus elymoides	bottlebrush squirreltail
Poa bulbosa	bulbous bluegrass
Verbascum blatteria	moth mullein
Centaurea solstitialis	Yellow star
Daucus carota	queen's anne lace
Tragopogon dubius	yellow salsify
Bromus commutatus	hairy brome
Aegilpos cylindrica	goatgrass
Centaurea diffusa	spotted knapweed
<b>Site C-Side channel</b>	
Cirsium arvense	Canada thistle
Typha latifolia	cattail
Verbascum thapsus	flannel mullein
Onopordum acanthium	scotch thistle
Nepeta cateria	catnip, mint
Phalaris arundinacea	reedcanary grass

**Table D-1  
Plant Species Identified at Proposed Project Site**

<b>Scientific Name</b>	<b>Common Name</b>
<b><i>Site D-Patawa Creek below side channel</i></b>	
Thinopyron intermedium	intermediate wheatgrass
Phalaris arundinacea	reedcanary grass
Verbascum blatteria	moth mullien
<b><i>Site D-Patawa Creek below side channel (continued)</i></b>	
Epilobium ciliatum	common willowherb
Dipsacus fullonum	teasel
Nepeta cateria	catnip mint
Rumex crispus	curly dock
Equisetum hyemale	scouring rush
Schoenoplectus tabernaemontani	softstem bulrush
Eleocharis palustris	spike rush
Elaeagnus angustifolia	Russian olive
<b><i>Site E-Depressions</i></b>	
Eleocharis palustris	spike rush
Schoenoplectus tabernaemontani	softstem bulrush
Juncus spp	rush
Mimulus guttatus	monkeyflower
Polypogon monspeliensis	rabbitfoot grass
Salsola kali	Russian thistle
Typha latifolia	Cattail

# Appendix E

## Excerpts from New Jersey Light Pollution Study Commission's Report

Submitted April 1996 to the Governor and the Legislature  
State of New Jersey  
Christine Todd Whitman, Governor

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As noted in the summary, the causes of Light Pollution are many and the effects can be glare, energy waste, light trespass (nuisance light), and sky glow. Source: <http://users.erols.com/njastro/orgs/litepol4.htm>

- Most glare can and should be prevented. Glare affects the ability of drivers to perceive objects or obstructions clearly. Particularly sensitive to this problem are elderly drivers.
- Energy is wasted when excessive levels of illuminances are used. Inefficient luminaires can spill unwanted light well outside of the intended target area.
- Light trespass may be viewed as an invasion of privacy. Most obtrusive lighting conditions can be avoided.
- Inappropriate use of outdoor lighting can deteriorate the natural nighttime environment, particularly in areas preserved for fauna and flora. In addition, sky glow reduces the ability to observe the starry night sky.

*[For a further understanding of the terminology utilized in this report refer to the [IESNA Lighting Handbook](#).]*

The LPSC does, as the Legislature did, recognize Light Pollution as a problem and provides the recommendations and actions of this report to the Governor and the Legislature for their information and further consideration.

*[The following recommendations and action(s) are in no priority order and are not weighted in any manner or fashion.]*

### **Recommendations and Actions**

1. Nationally recognized lighting recommendations for illuminance levels and uniformity ratios should be followed, such as contained in the Illuminating Engineering Society of North America (IESNA) Lighting Handbook.

#### **Action(s):**

- A. There should be established New Jersey site improvement standards or local ordinances, which require this provision.

2. Roadway and area lighting should be designed to minimize misdirected and upward light from luminaires. The use of cutoff luminaires should be considered the first choice in design. Where the use of internal cutoff luminaires is not possible, the use of externally mounted shields to the luminaires may be substituted if feasible.

Action(s):

- A. All State of New Jersey and State of New Jersey funded projects should be required to conform to this practice.
  - B. Utility companies, lighting installers, and others involved with lighting design should follow this recommendation.
3. Architectural and sign lighting should be designed to minimize light that does not illuminate the target area.

Action(s):

- A. All State of New Jersey and State of New Jersey funded projects should be required to conform to this recommendation.
  - B. Planning boards should be encouraged to consider this recommendation in their site plan approval process.
4. Lighting of building exteriors should be minimized or eliminated during those hours when it is not needed. Lighting controls (such as timers, dimmers, motion sensing devices, and photosensors) should be encouraged.

Action(s):

- A. The State of New Jersey should evaluate the exterior lighting needs of its facilities and, where feasible, implement this recommendation as soon as possible.
  - B. Establish these requirements by local ordinance or through site improvement standards.
5. Commercial billboard lighting should be aimed at the target area and installed in such a fashion that spill light is kept to a minimum.

Action(s):

- A. Require by local ordinances.
6. Municipal engineers and planners and all those involved with lighting aspects should be made aware of the concerns regarding Light Pollution and how it can be addressed through lighting design.

Action(s):

- A. Upon adoption of site improvement standards containing street and site lighting provisions, state training on site improvement provisions should include training material that recognizes Light Pollution concerns and how proper lighting design assists in its reduction.
- 7. Areas of New Jersey determined to be especially suitable for astronomical observations or which provide nocturnal benefits to flora and fauna should be considered for designation as "dark areas." *[A "dark area" is an area in which lighting is prohibited or limited in order to 1) address concerns regarding Light Pollution which impact the environment and 2) restore a more natural view of the starry sky.]*

Action(s):

- A. Within twelve months of issuance of this report the State of New Jersey should "map" the State to identify these "dark areas."
- B. The State of New Jersey should consider formulating a plan to retain or, where possible, reduce lighting levels in those parts of the "dark areas" which are under control of the State. County and municipal government should be encouraged to retain or reduce existing lighting levels in "dark areas" they own.
- C. The State's plan should include surveying and evaluating the lighting in all the state parks forests, fish and wildlife management areas, and other State-owned rural lands.
- D. The State's plan should also contain recommendations for encouraging businesses and homeowners in the privately-owned parts of the "dark areas" to comply with the recommendations of this report.
- 8. The use of materials and devices, such as reflectors, should be evaluated and considered in lieu of additional lighting. *[Even so, the IESNA Lighting Handbook recommendations should be followed; see Recommendation 1.]*

Action(s):

- A. The NJ Department of Transportation should continue to study and evaluate the use of such materials and devices on road surfaces, signs, etc., in lieu of additional lighting.
- 9. The general public should be provided information about Light Pollution and how to minimize it. This can be accomplished through



general instruction in schools, manufacturers' literature, company flyers, State programs, or other mechanisms.

Action(s):

- A. State agency or agencies or other governmental authorities are to develop and disseminate information regarding Light Pollution in accordance with recommendations of this report. As an example: The New Jersey State Museum should further emphasize sky glow concerns and ways to reduce Light Pollution during presentations at the planetarium and provide an educational display.
10. Training and educational opportunities should be made available to lighting professionals, contractors, installers, inspectors and others, with respect to Light Pollution.

Action(s):

- A. Educational institutions should offer course material on Light Pollution.
11. Local municipalities should be provided with a set of guidelines to use as a starting point in developing standards and ordinances to reduce Light Pollution.

Action(s):

- A. The State of New Jersey should fund the development (by a professional organization knowledgeable in Light Pollution concerns, such as the IESNA) of a set of such guidelines. This funding should be provided within the next twelve months.
12. The State of New Jersey should provide exemplary lighting installations ("demonstration projects") to serve as working models of good lighting practice with respect to Light Pollution concerns.

Action(s):

- A. The State of New Jersey shall select one or more state or State-sponsored facilities and roadways to serve as examples of responsible area lighting, street lighting, architectural lighting, sign lighting, and billboard lighting, and shall suitably equip and light those facilities.
- B. The state of New Jersey shall advertise the existence of these model installations.

## Appendix F

### Economic Impact of Infrastructure and Building Construction

A construction project has a direct impact on an economy by paying wages that are typically spent in a local economy. There is also an indirect impact, since some percentage of these wages will then be spent again in the same local economy (the “multiplier effect.”) The best way to measure indirect impact is by using a multiplier figure that is based on local research. The most recent information for Morrow and Umatilla Counties is from a 1996 United States Department of Agriculture Forest Service economic model (IMPLAN), used here with permission of the Oregon Employment Division, which maintains a license.

IMPLAN is widely used and is utilized by the U.S. Forest Service to model and estimate the regional/local economic impacts of such things as forest plan revision alternatives, policy changes, and management decisions.

The following information about the IMPLAN model is from the Minnesota IMPLAN Group, Inc. website. For more information, see: <http://www.implan.com/index.html>

Input-output accounting describes commodity flows from producers to intermediate and final consumers.

The total industry purchases of commodities, services, employment compensation, value added, and imports are equal to the value of the commodities produced. Purchases for final use (final demand) drive the model. Industries produce goods and services for final demand and purchase goods and services from other producers. These other producers, in turn, purchase goods and services. This buying of goods and services (indirect purchases) continues until leakages from the region (imports and value added) stop the cycle.

These indirect and induced effects (the effects of household spending) can be mathematically derived. The derivation is called the Leontief inverse. The resulting sets of multipliers describe the change of output for each and every regional industry caused by a one-dollar change in final demand for any given industry. Creating regional input-output models require a tremendous amount of data. The costs of surveying industries within each region to derive a list of commodity purchases (production functions) are prohibitive.

IMPLAN was developed as a cost-effective means to develop regional input-output models. The IMPLAN accounts closely follow the accounting conventions used in the "Input-Output Study of the U.S. Economy" by the Bureau of

Economic Analysis (1980) and the rectangular format recommended by the United Nations.

The IMPLAN system was designed to serve three functions: 1) data retrieval, 2) data reduction and model development, and 3) impact analysis.

Comprehensive and detailed data coverage of the entire U.S. by county, and the ability to incorporate user-supplied data at each stage of the model building process, provides a high degree of flexibility both in terms of geographic coverage and model formulation.

The IMPLAN database, created by MIG, Inc., consists of two major parts: 1) a national-level technology matrix and 2) estimates of sectorial activity for final demand, final payments, industry output and employment for each county in the U.S. along with state and national totals. New databases are developed annually by MIG, Inc.

IMPLAN easily allows the user to do the following:

- Develop his/her own multiplier tables;
- Develop a complete set of SAM (Social Accounting Matrix) accounts;
- Change any component of the system, production functions, trade flows, or database;
- Generate type I, II, or any true SAM multiplier internalizing household, government, and/or investment activities
- Create custom impact analysis by entering final demand changes;
- Obtain any report in the system to examine the model's assumptions and calculations.

There are two components to the IMPLAN system, the software and databases. The databases provide all information to create regional IMPLAN models. The software performs the calculations and provides an interface for the user to make final demand changes.

**For more information, see: <http://www.implan.com/index.html>**